

CELLULAR COMMUNICATIONS SYSTEM WITH CENTRALIZED BASE
STATIONS AND DISTRIBUTED ANTENNA UNITS

ABSTRACT OF THE DISCLOSURE

5 A microcellular communications network includes a plurality
of base station units and corresponding antenna units. The base
station units are housed in a common location. Each includes
10 either conventional transmitters and receivers or all digital
transmitter and receiver equipment, and interface circuitry to a
mobile telecommunications switching office. The microcell
traffic output is applied to a frame generator/multiplexer. The
output of the frame generator/multiplexer is applied to a
15 digitally modulated laser. The laser output is conveyed by
fiber to a remote antenna unit, which demultiplexes the
microcell traffic signal and applies it to a digital-to-analog
converter. The output of the digital-to-analog converter is
applied to a power amplifier, which in turn is connected to a
main antenna.

20 RF signals from the mobile units are received at both a
main and a diversity antenna. The received signals are
filtered, digitized, multiplexed together and transmitted over
the optical fiber back to the base station. The strongest
signal is selected for use.

25 Deployment of an all digital microcellular communications
system occurs in two stages. The method thus allows for the
benefit of a digital system to be accomplished in the early
stages of the upgrade while without the expense of modifying the
digital microcell antenna units in the second stage of the
30 upgrade.

Digital filtering of the digitized RF signal is also
provided, so that only those channels associated with a cell are
extracted for transmission to and from the antenna unit, and a
digital passive handoff system provides for an FFT analysis of
35 all traffic in the cell and passive switching in response
thereto.

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